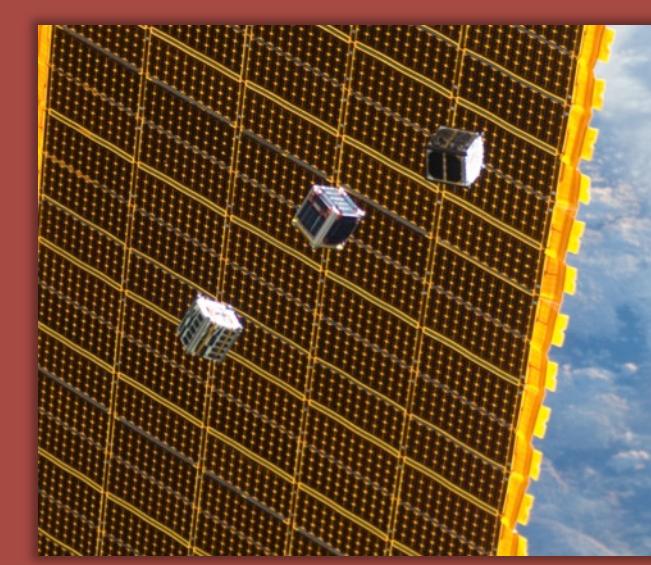




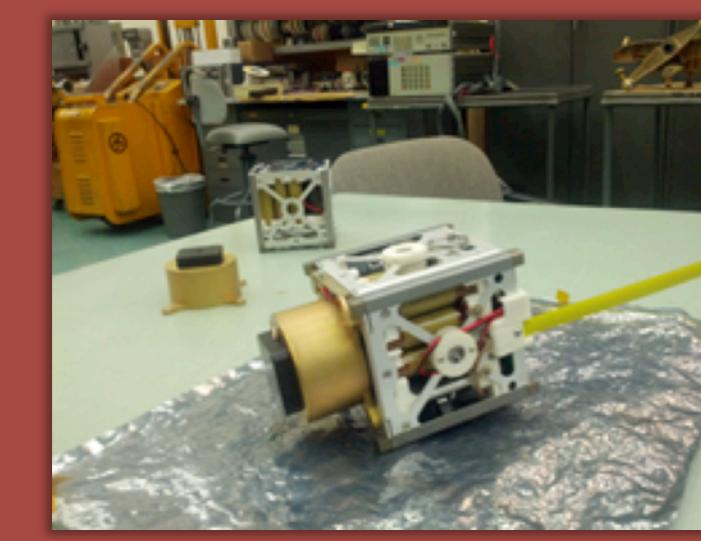
SOAREX - 6  
Aug 22, 2008



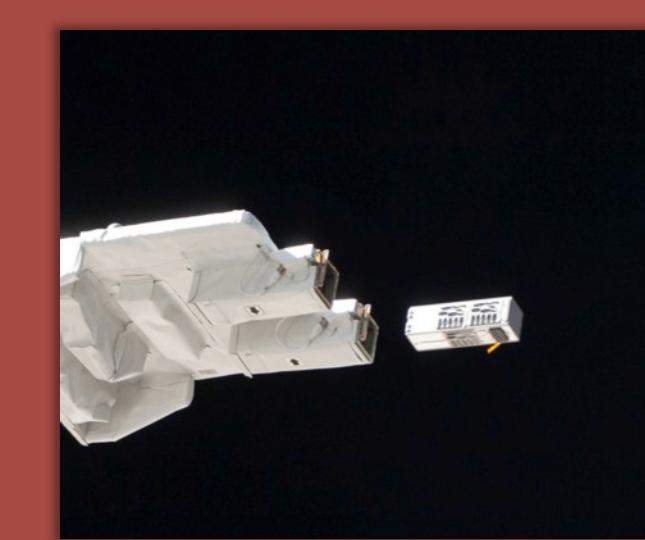
SOAREX - 7  
May 28, 2009



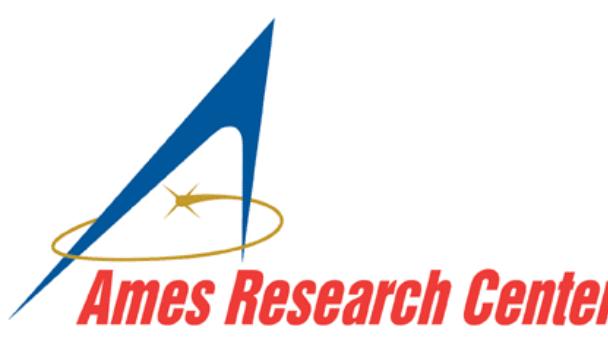
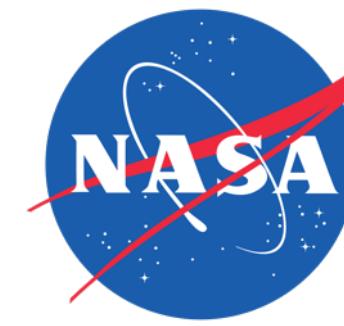
TES-1  
Oct 4, 2012



TES-2  
Aug 21, 2013



TES-3  
Nov 19, 2013



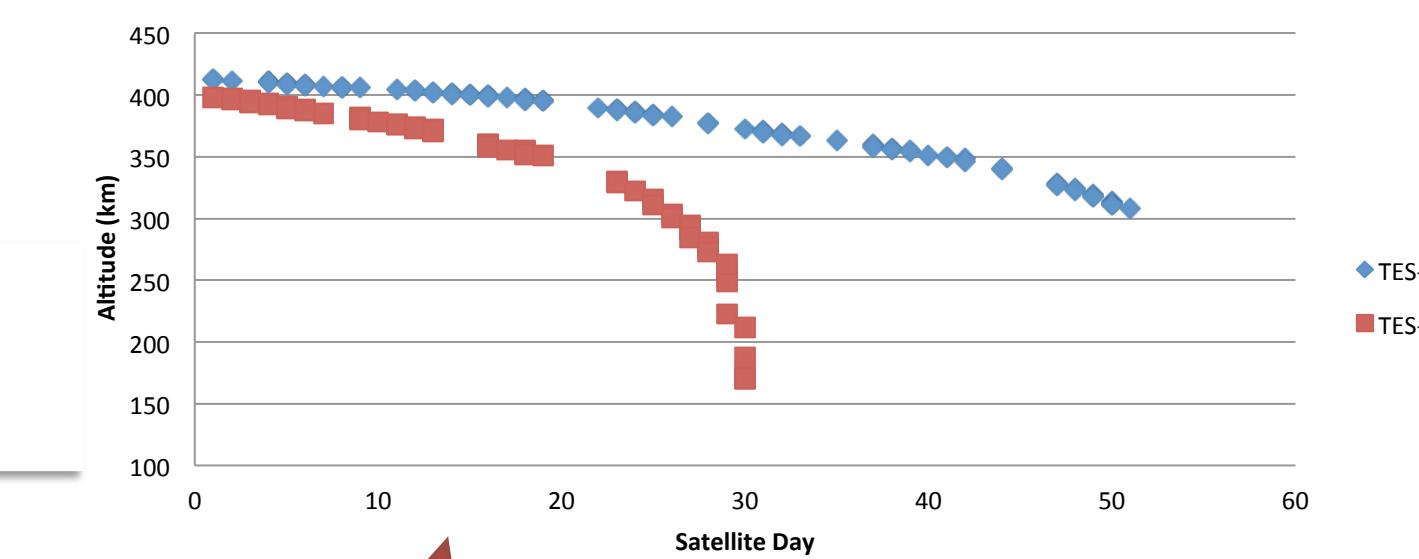
## The TechEdSat Series - A Platform for Rapidly Advancing Nano-Satellite Technologies and Capabilities

M. Murbach<sup>2</sup>, P. Papadopoulos<sup>1,4</sup>, D. Atkinson<sup>2, 3</sup>, A. Guarneros-Luna<sup>2</sup>, G. Pearhill<sup>1, 2</sup>, M. Bodmer<sup>1, 2</sup>, J. Mojica<sup>2</sup>, A. Reuter<sup>2</sup>, M. Scales<sup>2, 4</sup>, K. Sok<sup>1, 2</sup>, J. Cortez<sup>1</sup>, Benton<sup>1</sup>, T. Shu<sup>1, 4</sup>, R. Rivas<sup>1</sup>, J. Punzalan<sup>1, 4</sup>, A. Tabrizi<sup>1, 4</sup>, F. Tanner<sup>1, 4</sup>, R. Morrison, G. Nakashiki<sup>1, 4</sup>, J. Drew<sup>1</sup>, J. Swenson<sup>1</sup>, A. Tabrizi<sup>1</sup>, J. Wheless<sup>1, 2</sup>, R. Shimmin<sup>1</sup>, R. Alena<sup>1</sup>, <sup>1</sup>NASA Ames Research Center,

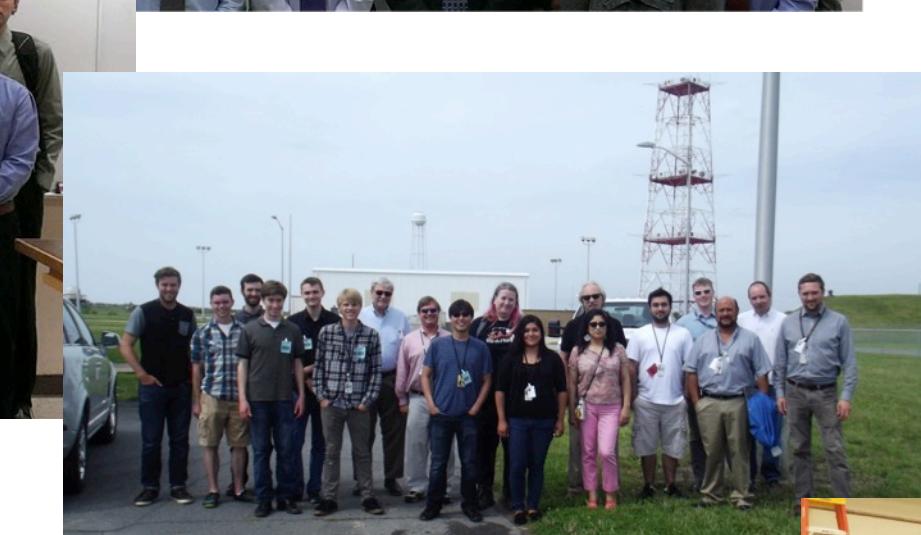
<sup>2</sup>University of Idaho, <sup>3</sup>NASA Jet Propulsion Laboratory, <sup>4</sup>San Jose State University

## RAPID DE-ORBIT:

TES-3p/TES-4 Comparison



## The Team



## University Collaboration

- University of Idaho
- San Jose State University
- University of Riverside

## Key Technology Advances

### Exo-Brake

- Novel and 'Safe' deorbit technique

### Advanced CubeSat Com

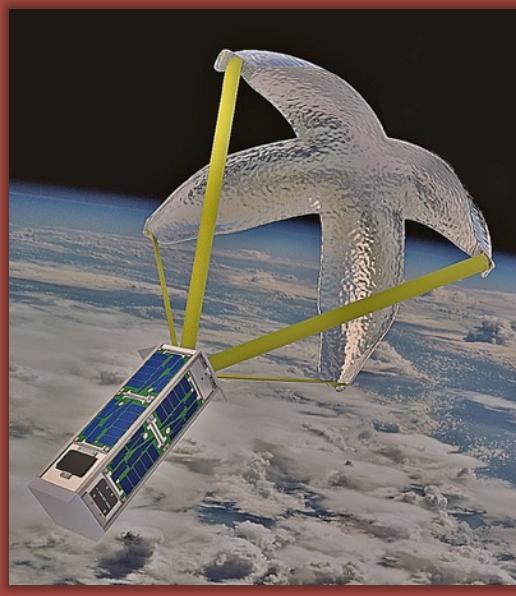
- Development of a 'TDRS-for-CubeSats'
- Obviating the need for ground stations
- Rapid command uplink capabilities
- X-Band, Advanced S-Band, Wireless Sensors through 802.15.4

### ISS Design/Safety Process for Nanosatellites

- ISS compatible design and testing process for rapid flight opportunities

### SCRAMP (Slotted Compression Ramp Probe) and the TDRV (Tube Deployed Reentry Vehicle)

- Self-stabilizing reentry probe
- Shock/Shock Interaction
- Transpiration studies



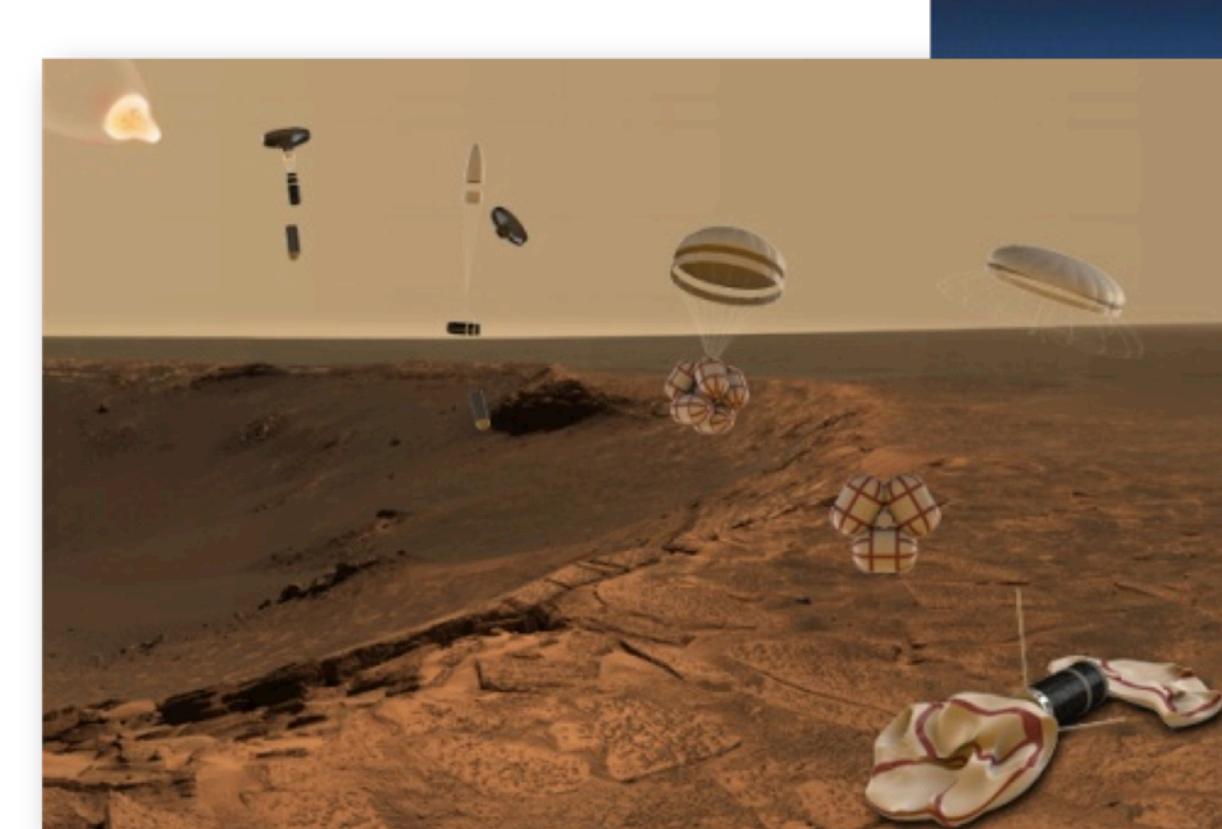
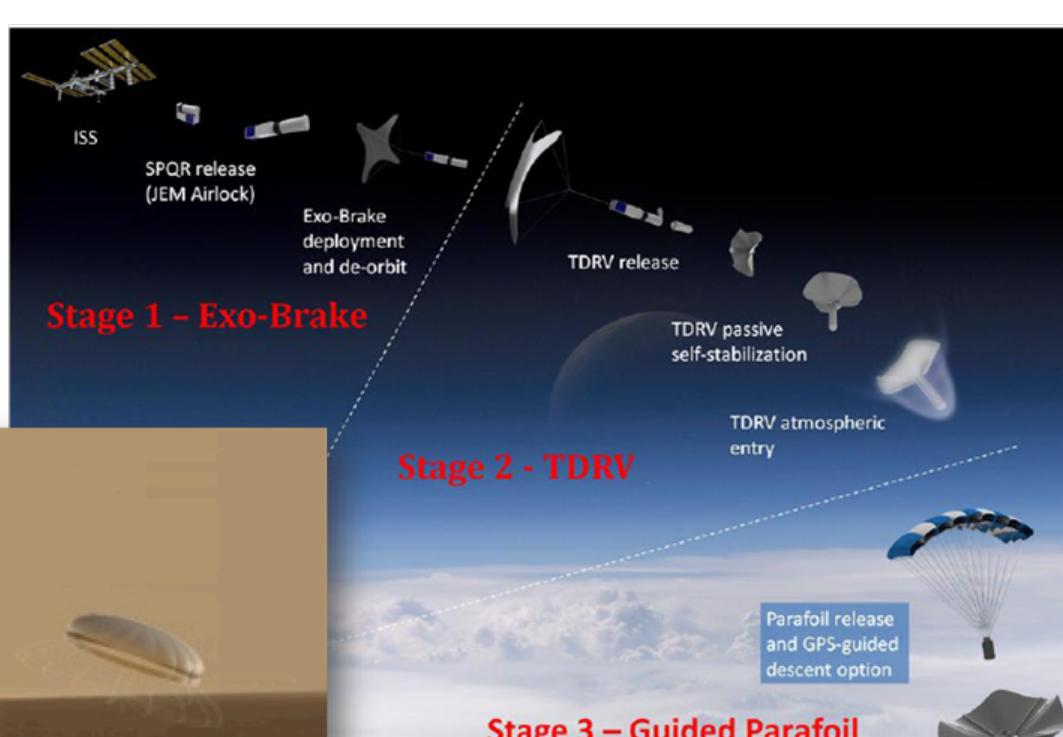
TES-4  
March 3, 2014



SOAREX-8  
July 7, 2015



TES-5  
Expected  
Late 2015



## Applications

### ISS/Orbital Platform Sample Recovery

- Recovering up to 3kg samples

### ATROMOS Mars Surface NanoSatellite Mission Concepts

- Exploring critical, high-risk regions of Mars